[4-1600-C-02] Screening (in vitro) The Inhibition Effect of Generally Recognized As Safe (GRAS) Substances on The Postharvest Fungal Pathogens and Its Modelling

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Botrytis cinerea is one of ubiquitous fungal pathogens, mainly found in several kinds of citrus fruits and stone fruits. The use of mathematical models for quantifying and predicting microbial density has gained increasing attention because it is useful to assess biological hazards in human and animal healthcare. This study aimed to screen the effect of GRAS (Generally Recognized As Safe) substances (sodium benzoate, sodium propionate and sodium dehydroacetate) on the inhibition of mycelium growth (diameter: mm) of pathogenic fungi, Botrytis cinerea, in vitro study, and also to model the efficacy of antifungal activity of GRAS substances by using mathematical models. The influence of GRAS substances at different concentrations (0.1-2%) was used to evaluate antifungal activity. Sodium dehydroacetate at 0.1% showed the highest effectiveness in inhibition B. cinerea than the other substances at 25°C during 45 days of incubation. Three mathematic models, including modified logistic model, modified Gompertz model, and Baranyi and Robert model, were employed to predict the growth curve of B. cinerea treated with sodium propionate, where the root mean squares error (RMSE) and R² were employed to evaluate the performance of each model. The modified logistic model showed the highest performance with the satisfactory statistical indices (highest R² and lowest RMSE) which indicated the better fit than other models. It can be concluded that sodium dehydroacetate is a potential GRAS substance in inhibiting B. cinerea and modified logistic model is a useful model to evaluate the mold growth under the various concentrations of sodium propionate treatment.